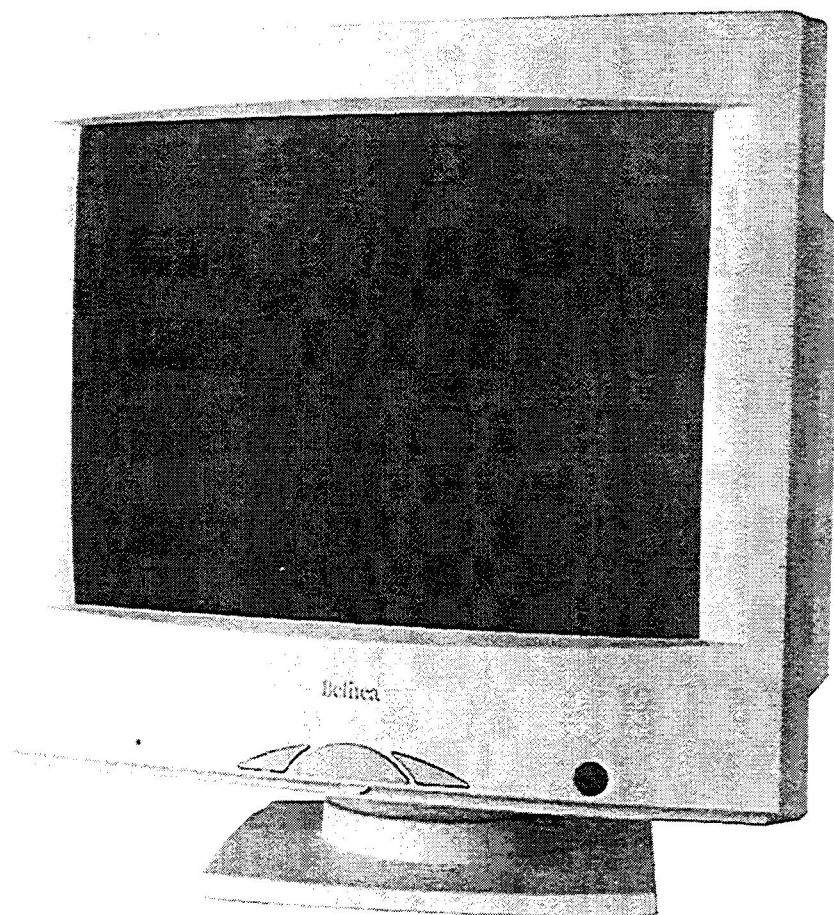


# **Belinea 10 60 20**

## **Color Monitor Service Manual**



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# CAUTION:

Before servicing this chassis, read the  
"IMPORTANT SERVICE SAFETY INFORMATION"  
on next page of this manual.

# SPECIFICATIONS

- Picture Tube:
  - CRT Size : 48cm (19") diagonal
  - Viewable Size : 45cm (17.7") max. Screen diagonal
  - Deflection : 90 degree deflection
  - Dot Pitch : 0.26mm
  - Phosphor : P22
- Input Signal:
  - Video : Analog
  - Sync : Separate TTL level
- Scanning Frequency:
  - Horizontal : 30 - 95 KHz
  - Vertical : 47 - 150 Hz
- Display Area:
  - Horizontal : 346 ± 5 mm (STANDARD MODE)
  - Vertical : 260 ± 5 mm
- Bandwidth: 150 MHz (nominal)
- Resolution: 1600 × 1280/75 Hz(NI)
- Power Source: 100 to 240 Vac 60/50 Hz (full range)
- Power Consumption: 150 W (MAX)
- Input Connector: D-15 PIN mini D-SUB
- Display Color: Limited only by the VGA Card
- Front Control: Encoder with Push-on Switch, Power SW
- Environment:
  - Operating Temperature : 0°C to 40°C
  - Operating Humidity : 20% to 80%
  - Nonoperating Temperature : -20°C to 65°C
  - Nonoperating Humidity : 10% to 85%
- Dimensions: 500mm(W)x487mm(H)x480mm(D)(With Base)
- Weight: Approx. 20.5 Kgs(NET)

# DISASSEMBLY INSTRUCTIONS

## CABINET BACK REMOVE (Figure 3)

1. Remove the screws located on the back cover of the monitor bottom.
2. Gently slide the rear cover backwards until free of the monitor chassis.

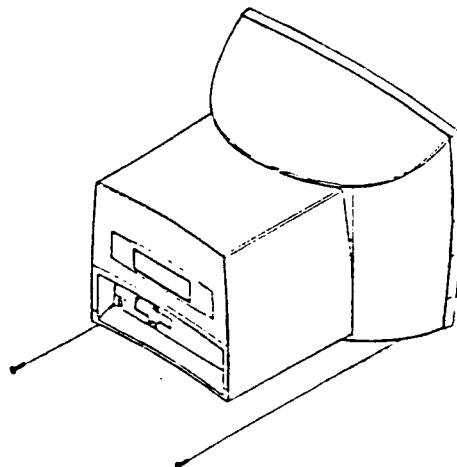


Figure 3

## MAIN PCB REMOVAL (Figure 4)

1. Discharge the residual high voltage from the CRT Anode through a 100K $\Omega$  resistor to the flyback Transformer mounting bracket.
2. Remove the Anode Cap from the CRT.
3. Remove all connectors and jacks from the Main PCB.
4. Gently slide the Main PCB backwards until free of the mounting brackets. Be careful not to damage the switches and control shafts.

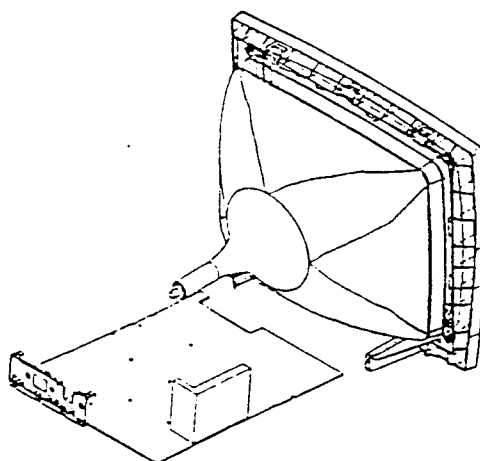


Figure 4

## CRT REMOVAL (Figure 5)

1. Place the monitor face down on a soft surface.
2. Remove the CRT and place it on a soft surface.

**NOTE:** Do not move the deflection yoke and magnet assembly attached to the CRT neck. Handle these assembly carefully to avoid damaging them.

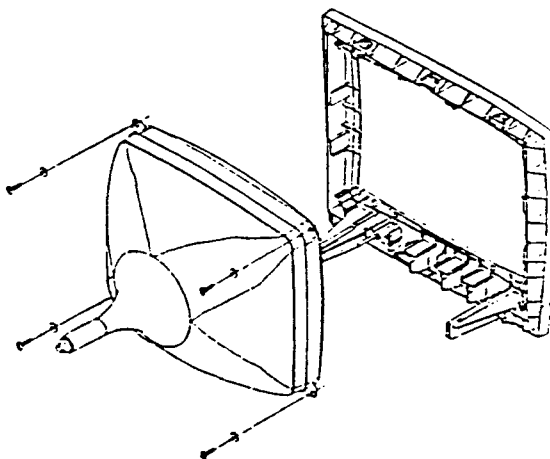


Figure 5

# THEORY OF OPERATION

1. VIDEO AND OSD(On Screen Display) AMPLIFIER  
U801 (MC13282) is a full feature video pre-amplifier with OSD input.
  - # Pin 8, 10, 12 is R, G, B OSD input.
  - # Pin 2, 4, 6 is R, G, B video input.
  - # Pin 22, 19, 15 is R, G, B video output.
  - # The video signal from IC output is fed into the cascode-type video power amplifier.
2. VIDEO POWER AMPLIFIER  
U803 (CVA2412AX) is designed to drive a CRT. The device is used with pre-amplifier (U801), where the common emitter transistor is already a part of the pre-amplifier.
  - # Pin 7, 8, 4 is cascode buffer Emitter and be connected to Q810, Q811, Q812.
  - # Pin 5, 10, 2 is R, G, B power output.
3. DEFLECTION PROCESS AND HIGH-VOLTAGE GENERATION CIRCUIT  
U401 (TDA9105) is to control all the functions related to the horizontal and vertical deflection in a multimodes monitor. It's main functions are:
  - # Positive or Negative sync polarities.
  - # Auto-sync horizontal processing.
  - # Auto-sync vertical processing.
  - # East/West signal processing block.
  - # H-PLL lock/unlock identification.
  - # Safety blanking output.
  - # U405, U406, U407, Q437, Q438, T407, Q431, L403, Q425 are used for high-voltage generation output.
  - # U403, U404, Q439, Q440, Q418, T406, Q401, Q402, T403, Q404, T401, Q403 are used for deflection generation output.
  - # U402, Q419, Q420, Q421, Q422, T405 are used for dynamic focus controller.
4. VERTICAL DEFLECTION OUTPUT CIRCUIT  
U301 (TDA8172) is a TV vertical deflection output circuit. It's main function are:
  - # Power amplifier.
  - # Flyback generator.
  - # Thermal protection.
5. MONITOR ON SCREEN DISPLAY  
U802 (LXC4371PL) is a micro controller unit to allow colored symbols or characters to be displayed onto color monitor. There are 8 channels for external digital to analog control.
6. MICRO-CONTROLLER  
U201 (UM68P61) is an HCMOS micro-controller unit with dedicated peripherals for TV and Monitor applications. It's main function are:
  - # Include Run, Wait, and Stop Modes.
  - # 8Kx8 ROM, 256x8 RAM
  - # Sync Processor for video timing analysis
  - # Watchdog for system reliability and integrity.

# 12 8-bit PWM/BRM Digital to Analog outputs. -

7. SWITCHING POWER SUPPLY

AC power is rectified by D102, then filtered by C107.

Power is transferred by T102 to the secondary circuit.

U102, U103 and U107 control and stabilize the output voltage.

VR101 adjusts the output voltage.

Q107 is the over voltage protector.

8. POWER FACTOR CORRECTION

U101 is a controller and driver of Q101 (MOSFET) for the implementation of active power factor correction, for sinusoidal line current consumption. It's main function are:

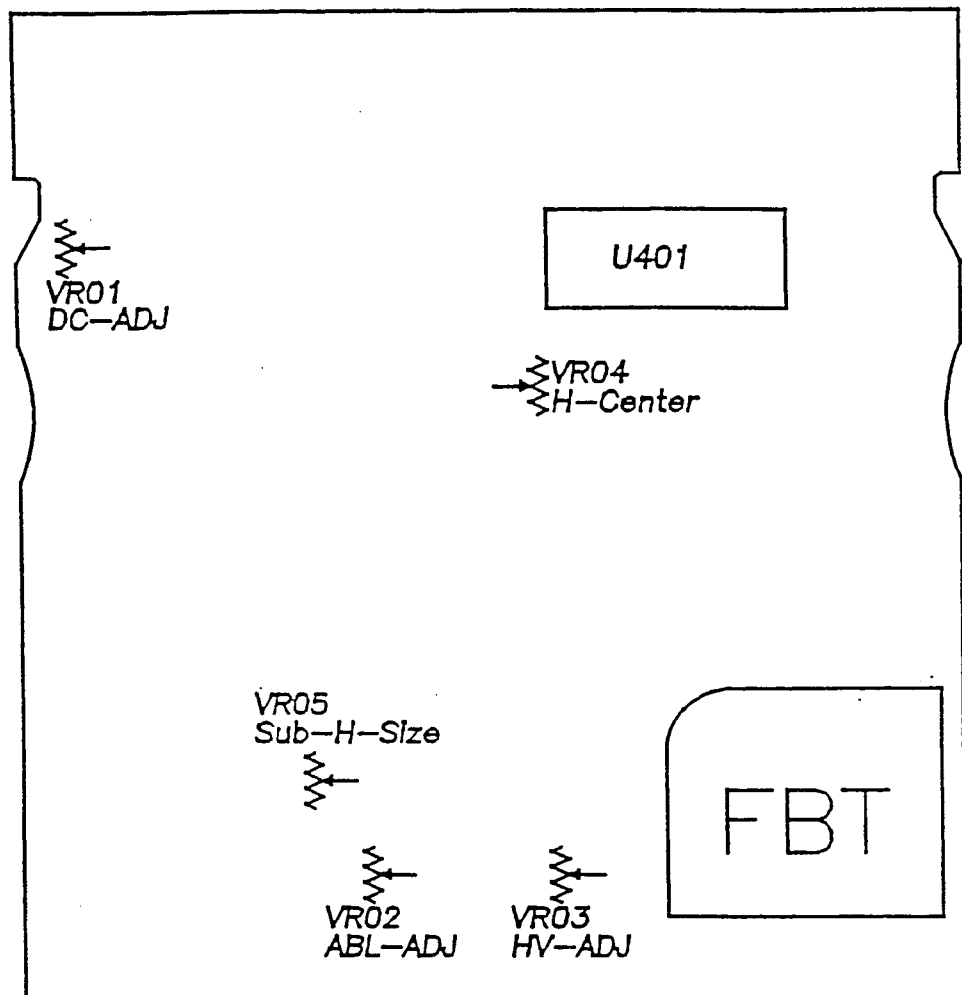
# Undervoltage lock out.

# Overvoltage protection

# Quadrant multiplier.

## LOCATION OF CONTROLS

### MAIN PCB



### CRT PCB

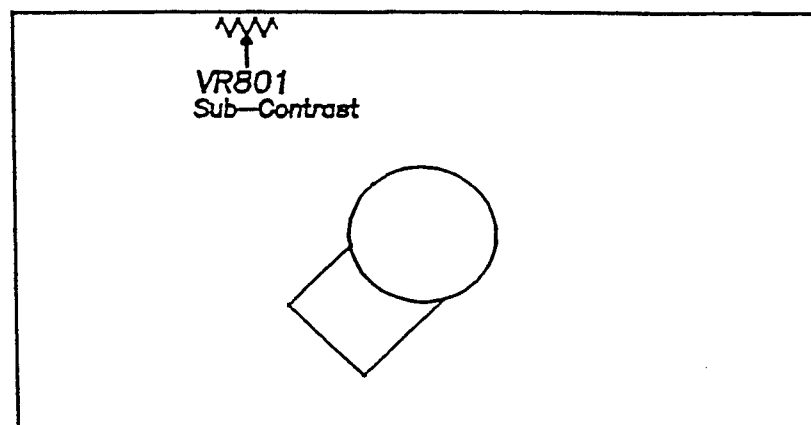


Figure 6






# ELECTRICAL ADJUSTMENT


## (1) BEFORE ADJUSTMENT

1. Equipment:  
Video Signal Generator (Quantum Data Model 903/Chroma Model 2135)  
Personal Computer or VGA card  
Color Analyzer (MINOLTA CA-100)
2. Set all SVR to half (The SVR SET on central point).
3. AC power input: 100 to 240 Vac 60/50 Hz.
4. Check item: MODE 1 to MODE 10 (refer the Chapter of Display Mode and Timing chart).
5. Before starting adjust each item makeing sure the MODE and Timing is matched with each adjustment item.

## (2) B+ (205V) ADJUSTMENT (VR01)

1. Input voltage 110Vac to monitor.
2. Set Video Signal Generator to MODE 2 (31 KHz) and input to monitor.
3. Press and rotate the Encoder to set Contrast  and Brightness  to MIN.
4. Press and rotate the Encoder to select Horizontal width .
5. Press and rotate the Encoder to adjust Horizontal width =  $346 \pm 5$  mm.
6. Turn FBT screen VR to make raster = 0 FL.
7. Connect Digital Voltmeter between C127 negative and GND.
8. Adjust B+ to 205V( $\pm 1$ V) by turning VR101.
9. Check  $V_{D115(N)} = 7.2 \pm 0.3 V_{DC}$ ,  $V_{D113(N)} = 14.7 \pm 0.5 V_{DC}$ ,  $V_{D112(N)} = 80 \pm 1.5 V_{DC}$ ,  $V_{D114(P)} = -12 \pm 0.3 V_{DC}$ .

## (3) HIGH VOLTAGE ADJUSTMENT (VR03)

1. Set Video Signal Generator to MODE 2 (31 KHz) and input to monitor.
2. Connect High Voltage Meter between Anode Cap and GND.
3. Press and rotate the Encoder to select Horizontal width .
4. Press and rotate the Encoder to adjust Horizontal width =  $300 \pm 5$  mm.
5. Set Brightness to make raster = 0 FL.
6. Set Contrast to MIN.
7. Adjust VR03 to let High voltage =  $25.9 \pm 0.1$  KV.
8. Set Video Signal Generator to MODE 10 (93 KHz) and input to monitor.
9. Check High voltage value in -0.3KV ~ -0.5KV.

## (4) MODE 10 (93 KHz) CHECK


1. X-RAY test: short D435 to check X-RAY circuit (screen shut down).
2. Adjust VR04 let A-B =  $0 \pm 1$  mm (See Fig 7) for rater center.

## (5) DYNAMIC FOCUS CHECK


1. Connect Scope between FBT PIN 12 and GND.
2. Check Vertical Frequency Pallabola wave =  $165 V_{pp} \pm 15 V_{pp}$ .
3. Check Horizontal Frequency Pallabola wave =  $320 V_{pp} \pm 30 V_{pp}$ .

## (6) VERTICAL SIZE ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor.

2. Press and rotate the Encoder to select Vertical size .
3. Press and rotate the Encoder to adjust Vertical size =  $260 \pm 2$  mm.

(7) VERTICAL CENTER ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor.
2. Press and rotate the Encoder to select Vertical center .
3. Press and rotate the Encoder to adjust Vertical center  $\leq 2$  mm. (See Fig 7,  $|E-F| \leq 2$  mm)

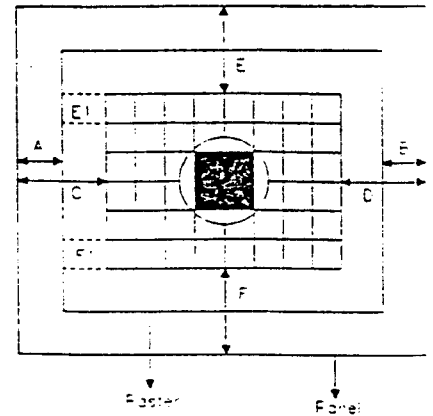




Figure 7


(8) HORIZONTAL SIZE ADJUSTMENT

1. Set Video Signal Generator to MODE 1 and input to monitor.
2. Press and rotate the Encoder to select Horizontal size .
3. Press and rotate the Encoder to adjust Horizontal size =  $346 \pm 3$  mm.

(9) HORIZONTAL CENTER ADJUSTMENT

1. Set Video Signal Generator to MODE 1 and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select Horizontal center .
3. Press and rotate the Encoder to adjust Horizontal center  $\leq 2$  mm. (See Fig 7,  $|C-D| \leq 2$  mm)

(10) PINCUSHION ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select Pincushion .
3. Press and rotate the Encoder to let  $X \leq 2.0$  mm (See Fig 8).

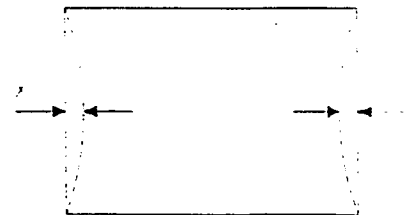



Figure 8

(11) TRAPEZOID ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select Trapezoid .
3. Press and rotate the Encoder to let  $Y \leq 2.0$  mm (See Fig 9).

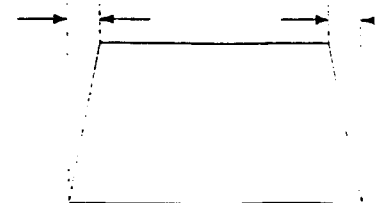



Figure 9

(12) BALANCE ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select Balance .
3. Press and rotate the Encoder to let  $P-B \leq 1.5$  mm. (See Fig 10).

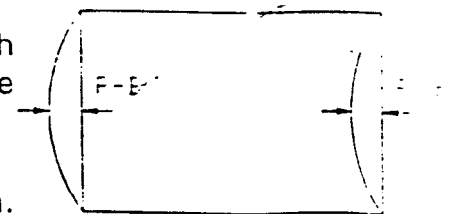



Figure 10

(13) PARALLEL ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select Parallel .
3. Press and rotate the Encoder to let  $P-R \leq 1.5$  mm. (See Fig 11).

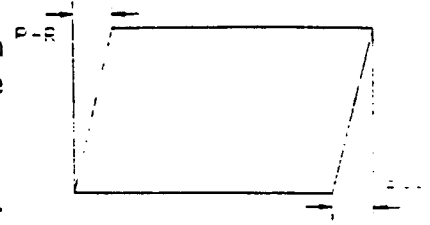




Figure 11


(14) ROTATION(TILT) ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select Rotation .
3. Press and rotate the Encoder to let Rotation  $\leq 1.5$  mm.











(15) MOIRE ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select Moire .
3. Press and rotate the Encoder to let video Moire is best.

(16) OSD ADJUSTMENT

1. Press and rotate the Encoder to select OSD position .
2. Press and rotate the Encoder to let OSD position in the picture center.

(17) SAVE FUNCTION

1. The monitor provides auto save function to save item(6) ~ (16) settings change. The auto save function acts when
  - i. Mode and adjustment change immediately.
  - ii. Mode persists and function adjustment changes at 10 seconds later.
2. FOR TECHNICIAN ONLY : The monitor provides another save method to save settings into factory standard area of EEPROM for technician only.
  - i. Factory standard area of EEPROM has stored the factory settings for user recall.
  - ii. If it is necessary to change the EEPROM factory standard area's setting, press and rotate the Encoder to select  (Information of the mode), then simultaneous press The Standby Power key and the Encoder 2 seconds. All symbols of the OSD windows changes color.
  - iii. The "new icon" function means as following:
    - 1)  Contrast = H-Linearity Adjust
    - 2)  Brightness = H-Dynamic Focus Adjust
    - 3)  V-size = R-cutoff Adjust
    - 4)  V-center = G-cutoff Adjust
    - 5)  H-width = B-cutoff Adjust
    - 6)  H-phase = R-gain Adjust
    - 7)  Pincushion = B-gain Adjust
    - 8)  Trapezoid = 9300°K Save
    - 9)  Balance = 6500°K Save

- 10) ☐ Parallel = Save All
- 11) ☐ Rotation = Recall All
- 12) ☒ Moire = Use's Mode Erase
- 13) ☐ Degaussing = Relay Test
- 14) ☐ Recall = Check List

(18) REPEAT ITEM (6) TO (16) AND CHANGE MODE 1 TO 10 IN SEQUENCE

(19) H-LINEARITY ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select H-Linearity.
3. Press and rotate the Encoder to adjust H-Linearity is best. (See Fig 12).

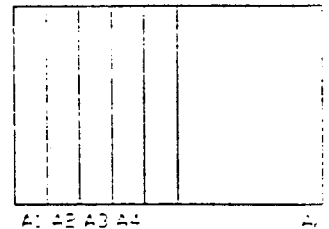


Figure 12

$$L = A_{\max} - A_{\min} / A_{av} \leq 7 \%$$

$$A_{av} = A_1 + A_2 + \dots + A_n / n$$

(20) H-DYNAMIC FOCUS ADJUSTMENT

1. Set Video Signal Generator to MODE 1 (Crosshatch Pattern) and input to monitor. (Mode may be changed 1 to 10 in sequence)
2. Press and rotate the Encoder to select H-Dynamic Focus.

(21) RASTER WHITE BALANCE (RASTER COLOR TEMPERATURE) ADJUSTMENT

1. Set Video Signal Generator to MODE 7 (60 KHz Raster Pattern) and input to monitor.
2. Press and rotate the Encoder to select Degaussing  $\mathcal{R}$ .
3. Press the Encoder to correct display distortion or discoloration due to magnetic field interference.
4. Press and rotate the Encoder to set Contrast  $\odot$  and Brightness  $\odot$  to MIN.
5. Adjust the Screen VR of FBT until the raster can be visible.
6. Check the picture showing what kind of color is.
7. Adjust the R-cutoff, G-cutoff and B-cutoff without showing the color on the picture until the color analyzer appears:
 
$$x = 0.281 \pm 5 \% \text{ (For } 9300^\circ\text{K)}$$

$$y = 0.311 \pm 5 \%$$
8. Adjust the Screen VR of FBT to let raster = 1.0 ~ 1.2 FL.
9. Check the raster keep in range 1.0 ~ 1.4 FL. When adjust raster color temperature.
10. Check Item 5. ~ 8. again.

(22) WHITE BALANCE (COLOR TEMPERATURE) ADJUSTMENT

1. Set Video Signal Generator to MODE 7 (60 KHz Bright Pattern) and input to monitor.
2. Set the Contrast Y = 20 ~ 25 FL.
3. Set the Brightness to cutoff.
4. Press and rotate the Encoder to select R-gain and G-gain.
5. Adjust the Encoder until the color analyzer appears:

$$x = 0.281 \pm 5 \%$$

$$y = 0.311 \pm 5 \%$$

6. Set the Contrast to MAX and check the color temperature. If color temperature over the specification, repeat steps 2. ~ 11.
7. Press and rotate the Encoder to select 9300°K Save.
8. Repeat Item (21), (22) steps.
9. Adjust the R/G/B-cutoff and R/G-gain until the Color Analyzer appear:  
 $x = 0.313 \pm 5 \%$  (FOR 6500°K)  
 $y = 0.329 \pm 5 \%$
10. Press and rotate the Encoder to select 6500°K Save.

(23) BRIGHTNESS ADJUSTMENT

1. Set Video Signal Generator to MODE 2 (31 KHz Raster Pattern) and input to monitor.
2. Make sure video input =  $0.7 V_{p.p.}$
3. Set the Contrast to MIN and the Brightness to Max.
4. Check raster = 1.0 ~ 1.4 FL by adjust FBT screen VR).
5. Press and rotate the Encoder to select Brightness and let raster =  $1.0 \pm 0.05$  FL.
6. Set to full white pattern, check CRT center picture = 1.5 ~ 3 FL.
7. Set Contrast to Max.
8. Set 1-MOSAIC(3") pattern.
9. Adjust VR601(sub-contrast) let CRT center block keep in range 50 ~ 60 FL. Factory sets 55 FL.
10. Set Video Signal Generator to High level input( $0.90 V_{p.p.}$ )
11. Check the screen.

(24) ABL ADJUSTMENT(VR02)

1. Set Video Signal Generator to MODE 2 (31 KHz Full White Pattern) and input to monitor.
2. Make sure video input =  $0.7 V_{p.p.}$
3. Adjust VR404(clockwise) let picture center = 30 FL ( $30 \pm 5$  FL).
4. Check the picture around lights up to 70%.

(25) FOCUS ADJUSTMENT

1. Set Video Signal Generator to MODE 10 (93K White Pattern) and input to monitor.
2. Press and rotate the Encoder to set Brightness to MIN make raster = 0 FL.
3. Set Contrast Y = 20 ~ 25 FL.
4. Change Video Signal Generator to MODE 10 (93K "H" Pattern)
5. Adjust FBT FOCUS VR to make the CRT display clear.

(26) CONVERGENCY ADJUSTMENT

1. Set Video Signal Generator to MODE 2 (31 KHz Purple Crosshatch Pattern) and input to monitor.
2. Check red and blue color of picture center is overlap or not. If it is not overlap, adjust 4 magnetic pole of CRT YOKE.
3. Set Video Signal Generator to MODE 2 (31 KHz White Crosshatch Pattern) and input to monitor.
4. Check red, green and blue color of picture center is overlap or not. If it is not overlap, adjust 6 magnetic pole of CRT YOKE.

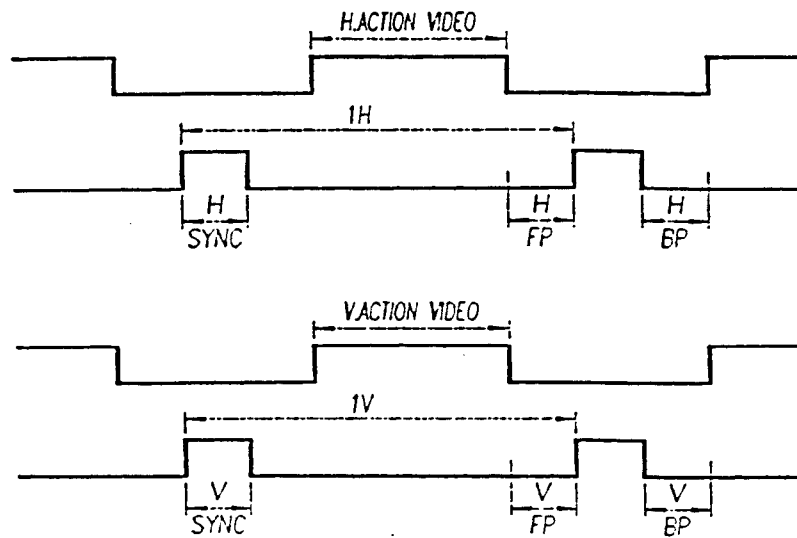
5. Fasten and glue magnetic pole tight, if you adjust it.

(27) POWER SAVING CHECK

1. Equipment: Video Signal Generator
  - i. Quantum Data Model 901
  - ii. Chroma Model 2135
2. Set Stand-by, Suspend and Off states into equipment as following.
  - i. Stand-by state  $\Rightarrow$  H-sync  $\leq$  10K Hz
  - ii. Suspend state  $\Rightarrow$  V-sync  $\leq$  10 Hz
  - iii. Off state  $\Rightarrow$  H-sync  $\leq$  10K Hz and V-sync  $\leq$  10 Hz
3. AC power input: 100 to 240 Vac 60/50 Hz.
4. Set Video Signal Generator(Chroma 2135) to Stand-by and input to monitor. Check power consumption below 15W in 5 seconds.
5. Set Chroma 2135 to MODE 2 and check the display is normal in 3 seconds.
6. Set Chroma 2135 to Suspend and check power consumption below 15W in 5 seconds.
7. Set Chroma 2135 to MODE 2 and check the display is normal in 3 seconds.
8. Set Chroma 2135 to Off and check power consumption below 5W in 5 seconds.
9. Set Chroma 2135 to MODE 2 and check the display is normal.

## DISPLAY MODE & TIMING CHART

This monitor provides 13 preset modes for match normal display card and 12 user's modes for special display card. As below chart and table are showing the detail value of preset mode. Please service technician accords table to set video signal generator for input/test/adjust the monitor.



Standard	IBM/VGA	IBM/VGA	VESA	VESA
Compatibility	MODE 1	MODE 2	MODE 3	MODE 4
Resolution	640x400	640x480	640x480	640x480
H. Polarity	—	—	—	—
H. Frequency	31.469 kHz	31.469 kHz	37.500 kHz	43.269 kHz
H. Front Porch	0.636 $\mu$ s	0.318 $\mu$ s	0.508 $\mu$ s	1.556 $\mu$ s
H. Sync	3.813 $\mu$ s	3.813 $\mu$ s	2.032 $\mu$ s	1.556 $\mu$ s
H. Back Porch	1.907 $\mu$ s	1.589 $\mu$ s	3.810 $\mu$ s	2.222 $\mu$ s
H. Action Video	25.422 $\mu$ s	25.422 $\mu$ s	20.317 $\mu$ s	17.778 $\mu$ s
V. Polarity	+	—	—	—
V. Frequency	70.086 Hz	59.940 Hz	75.000 Hz	75.000 Hz
V. Front Porch	0.381 ms	0.064 ms	0.027 ms	0.023 ms
V. Sync	0.064 ms	0.064 ms	0.080 ms	0.069 ms
V. Back Porch	1.112 ms	0.794 ms	0.427 ms	0.578 ms
V. Action Video	12.711 ms	15.571 ms	12.800 ms	11.093 ms

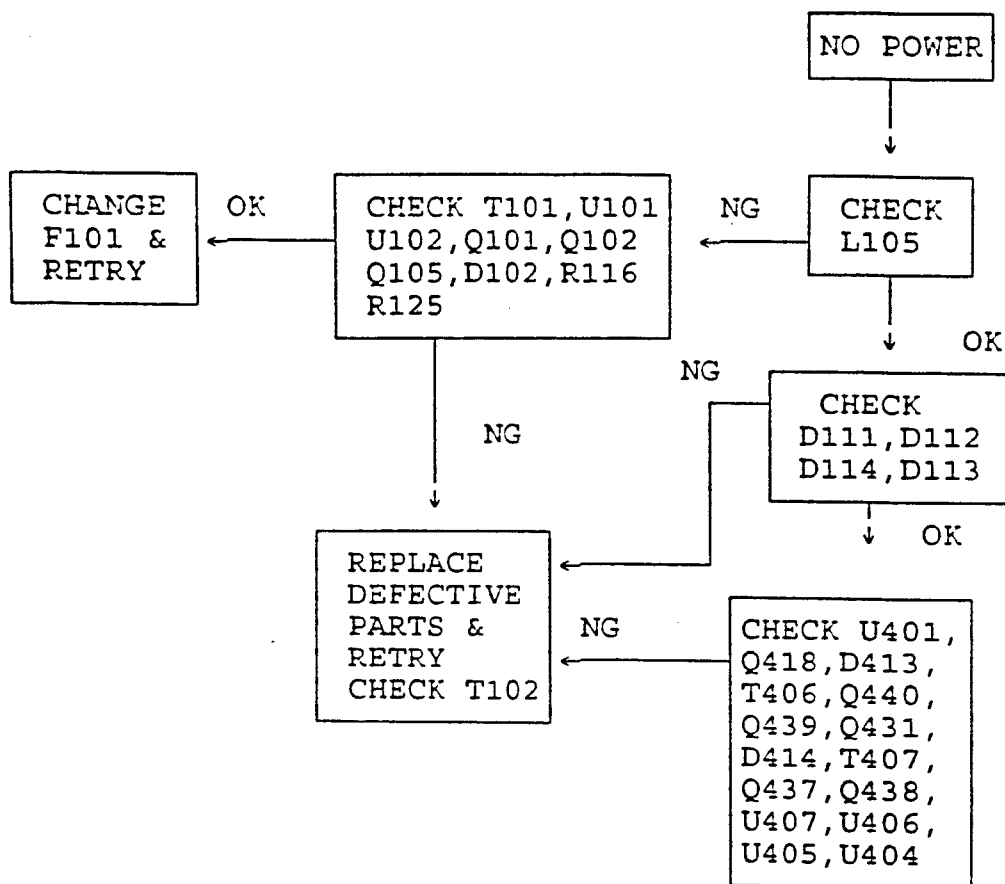
Standard	VESA	VESA	VESA	VESA
Compatibility	MODE 5	MODE 6	MODE 7	MODE 8
Resolution	800x600	800x600	1024x768	1024x768
H. Polarity	+	+	+	+
H. Frequency	46.875 kHz	53.674 kHz	60.000 kHz	68.677 kHz
H. Front Porch	0.323 $\mu$ s	0.569 $\mu$ s	0.203 $\mu$ s	0.508 $\mu$ s
H. Sync	1.616 $\mu$ s	1.138 $\mu$ s	1.219 $\mu$ s	1.106 $\mu$ s
H. Back Porch	3.232 $\mu$ s	2.702 $\mu$ s	2.235 $\mu$ s	2.201 $\mu$ s
H. Action Video	16.162 $\mu$ s	14.222 $\mu$ s	13.003 $\mu$ s	10.836 $\mu$ s
V. Polarity	+	+	+	+
V. Frequency	75.000 Hz	85.061 Hz	75.029 Hz	84.997 Hz
V. Front Porch	0.021 ms	0.019 ms	0.017 ms	0.015 ms
V. Sync	0.064 ms	0.056 ms	0.050 ms	0.044 ms
V. Back Porch	0.448 ms	0.503 ms	0.466 ms	0.524 ms
V. Action Video	12.800 ms	11.179 ms	12.795 ms	11.183 ms

Standard	VESA	VESA
Compatibility	MODE 9	MODE 10
Resolution	1280x1024	1280x1024
H. Polarity	+	+
H. Frequency	79.976 kHz	93.750 kHz
H. Front Porch	0.119 $\mu$ s	0.316 $\mu$ s
H. Sync	1.067 $\mu$ s	0.948 $\mu$ s
H. Back Porch	1.837 $\mu$ s	1.501 $\mu$ s
H. Action Video	9.481 $\mu$ s	7.901 $\mu$ s
V. Polarity	+	+
V. Frequency	75.025 Hz	75.000 Hz
V. Front Porch	0.013 ms	0.010 ms
V. Sync	0.038 ms	0.032 ms
V. Back Porch	0.475 ms	0.491 ms
V. Action Video	12.804 ms	12.800 ms

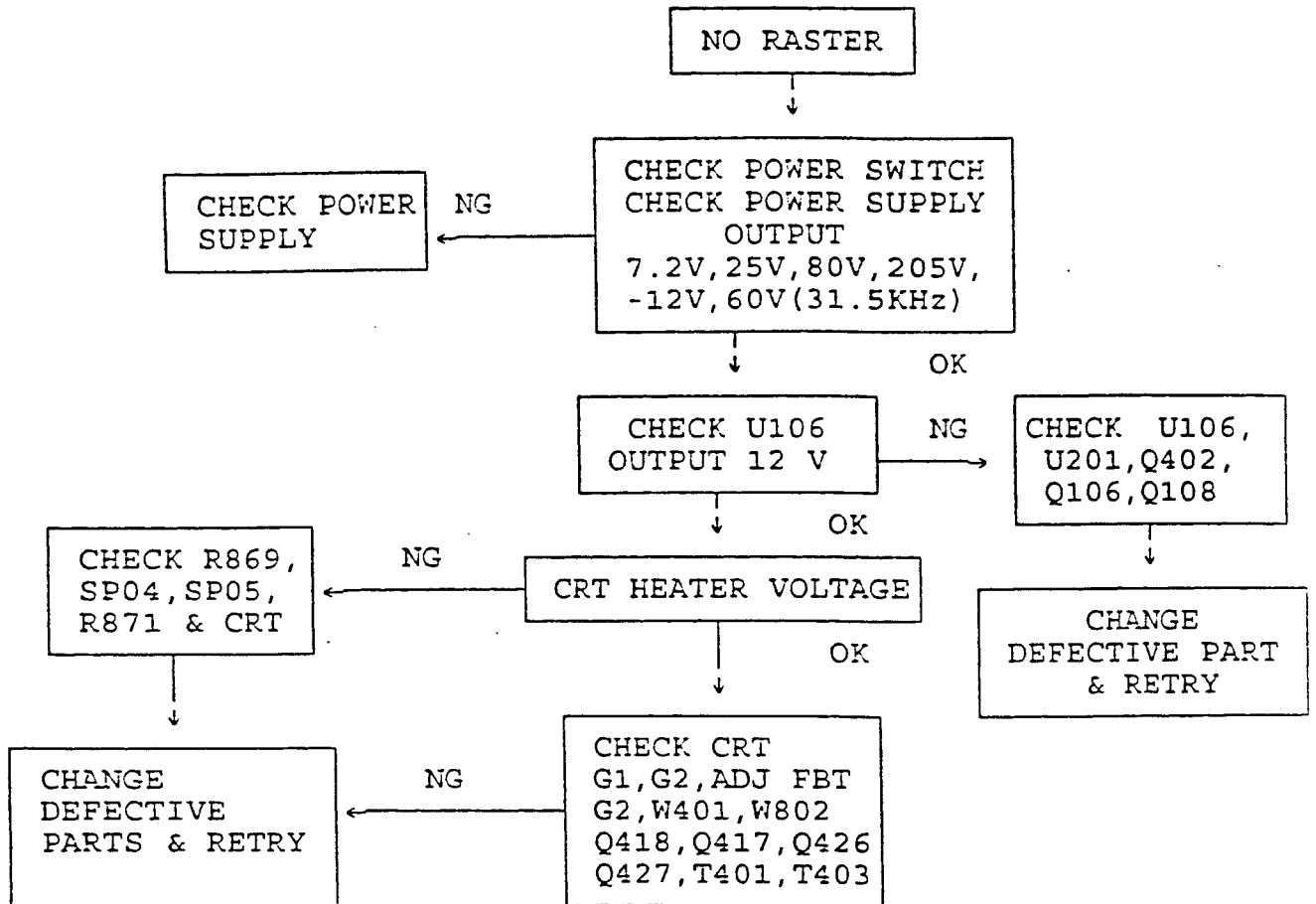


# TROUBLESHOOTING

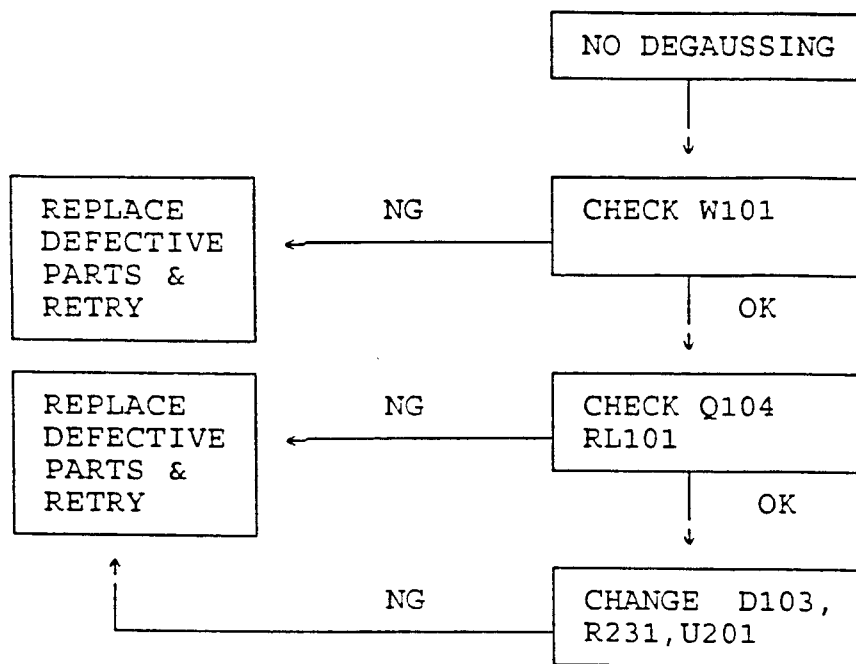
## 1. NO POWER



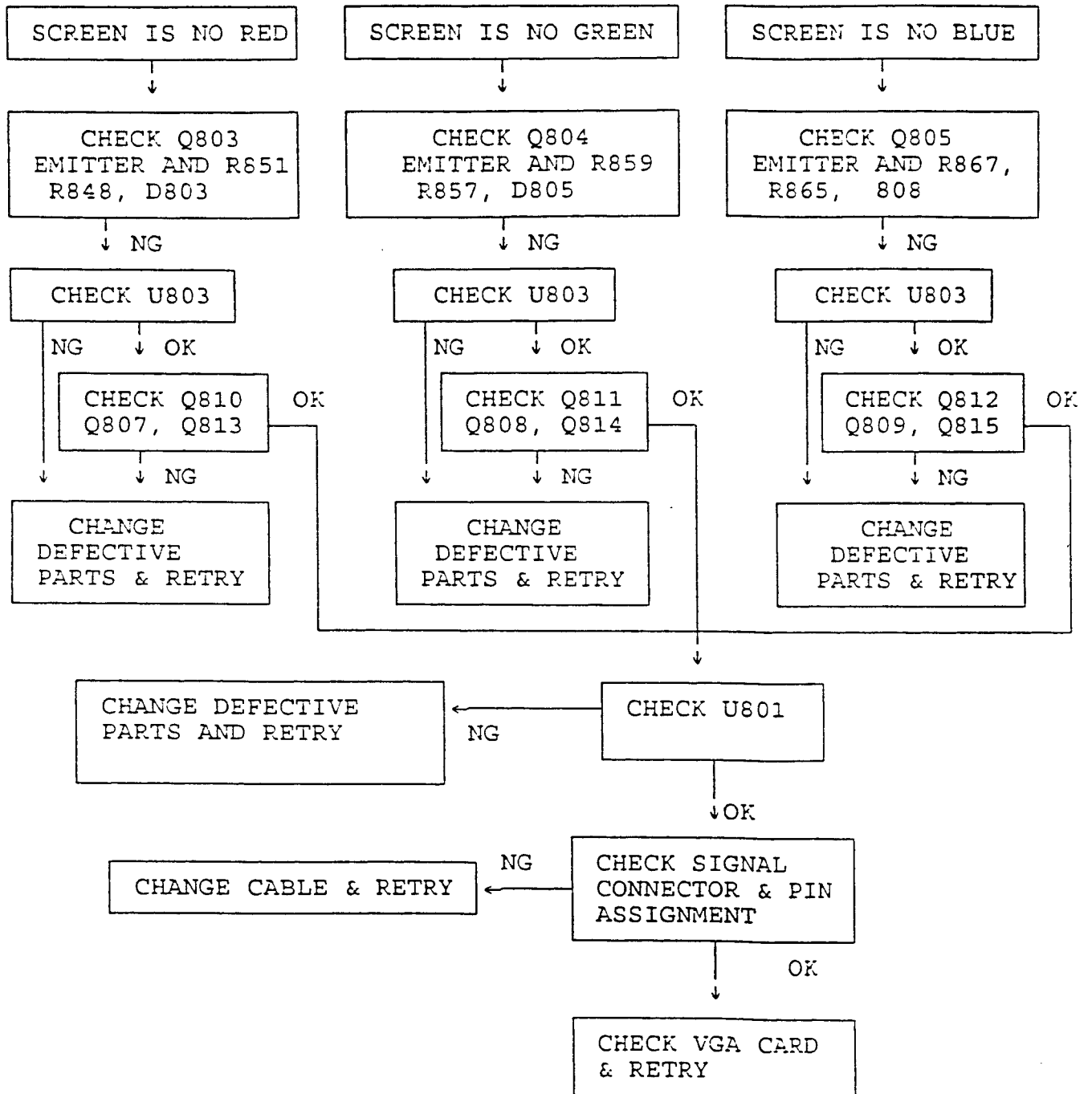
### 3. NO RASTER



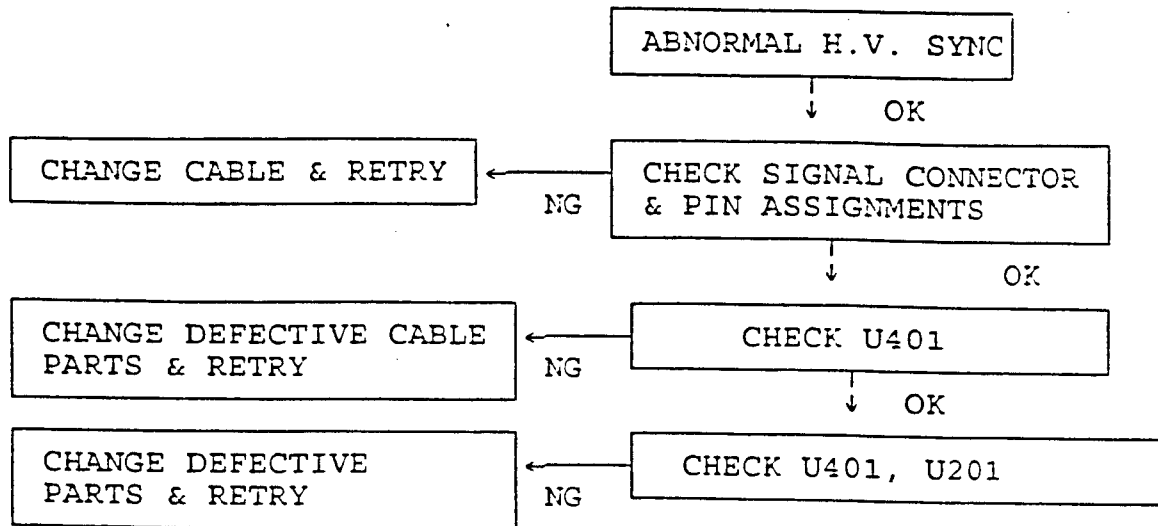
## 2. NO DEGAUSSING



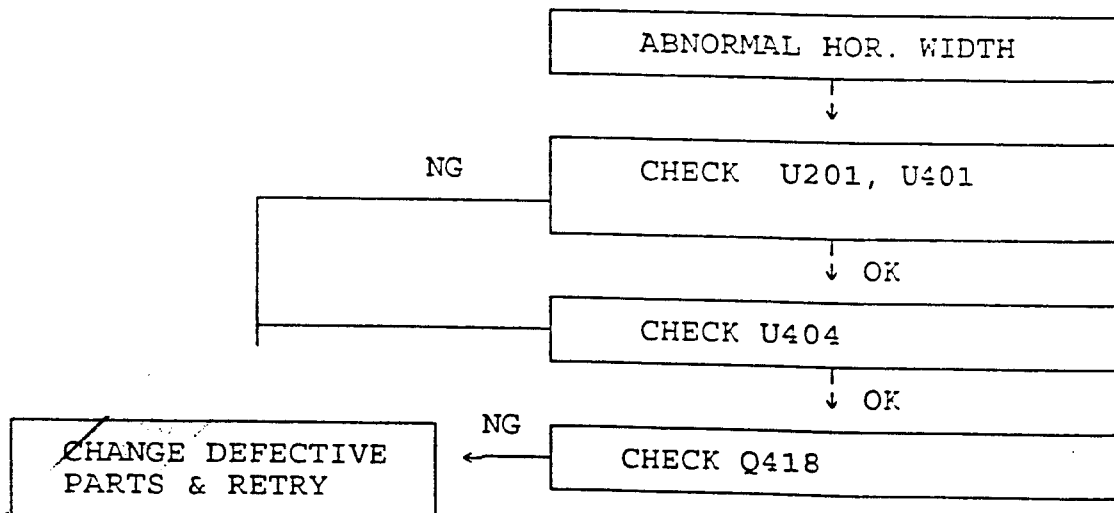
#### 4. PICTURE OR COLOR MISSING



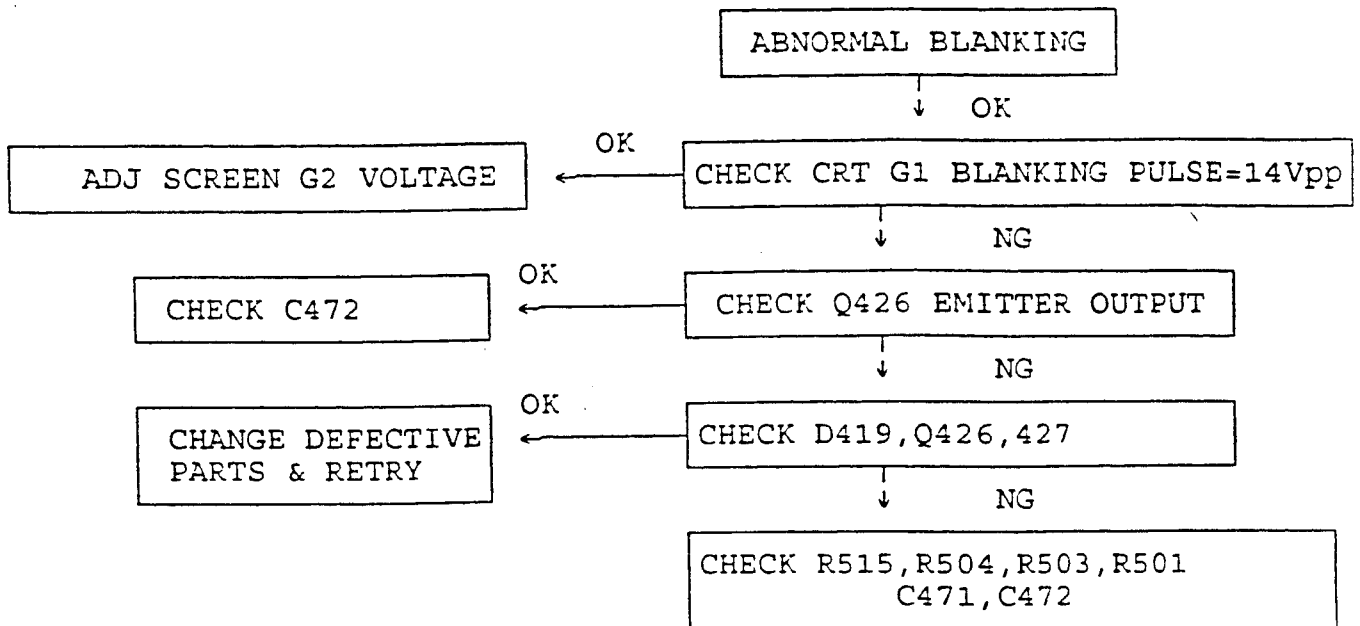
5. H.V. SYNC IS ABNORMAL



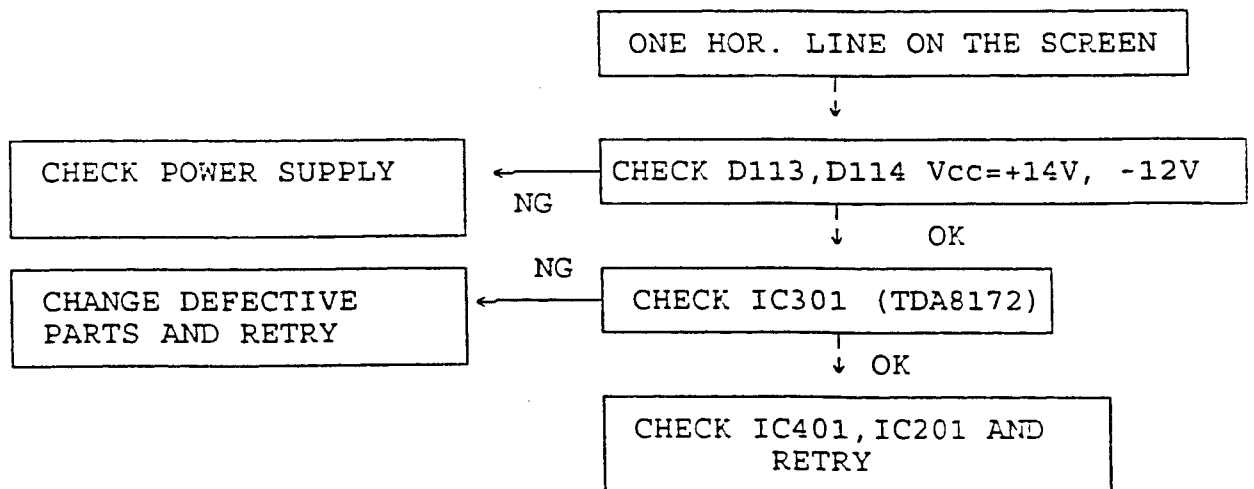
6. HOR. WIDTH CAN NOT ADJUST



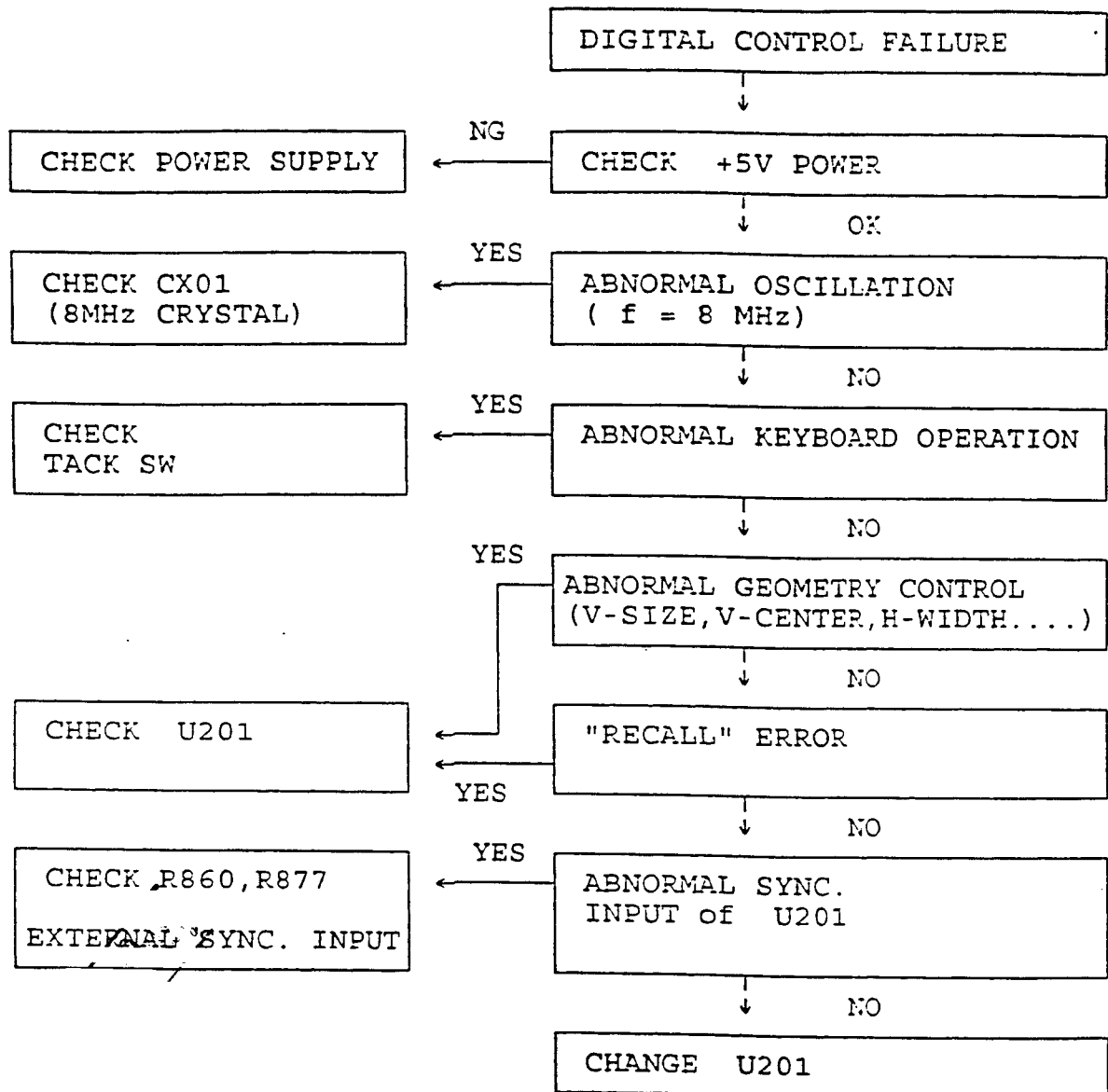
## 7. ABNORMAL BLANKING



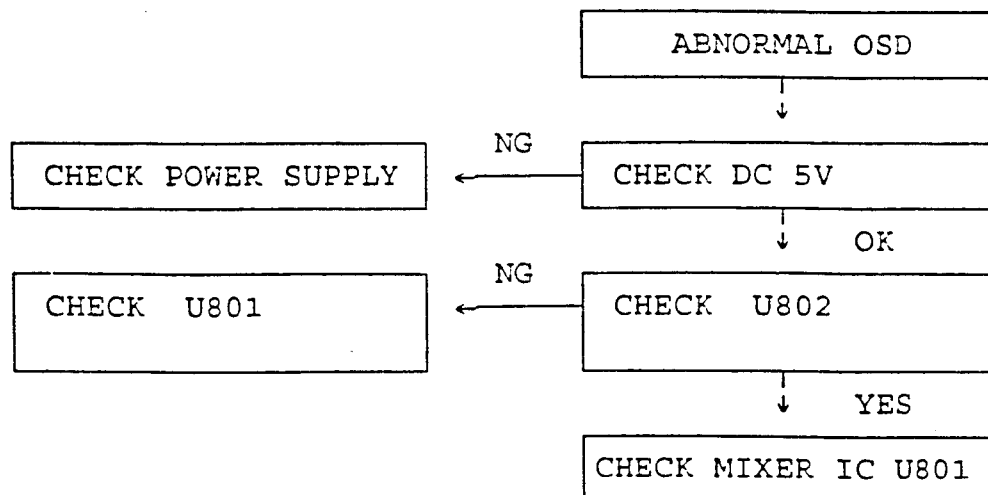
## 8. NO VERTICAL SCAN OR VERTICAL SIZE CAN NOT ADJUST



## 9. DIGITAL CONTROL FAILURE

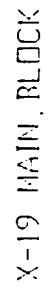


## 10. ABNORMAL OSD

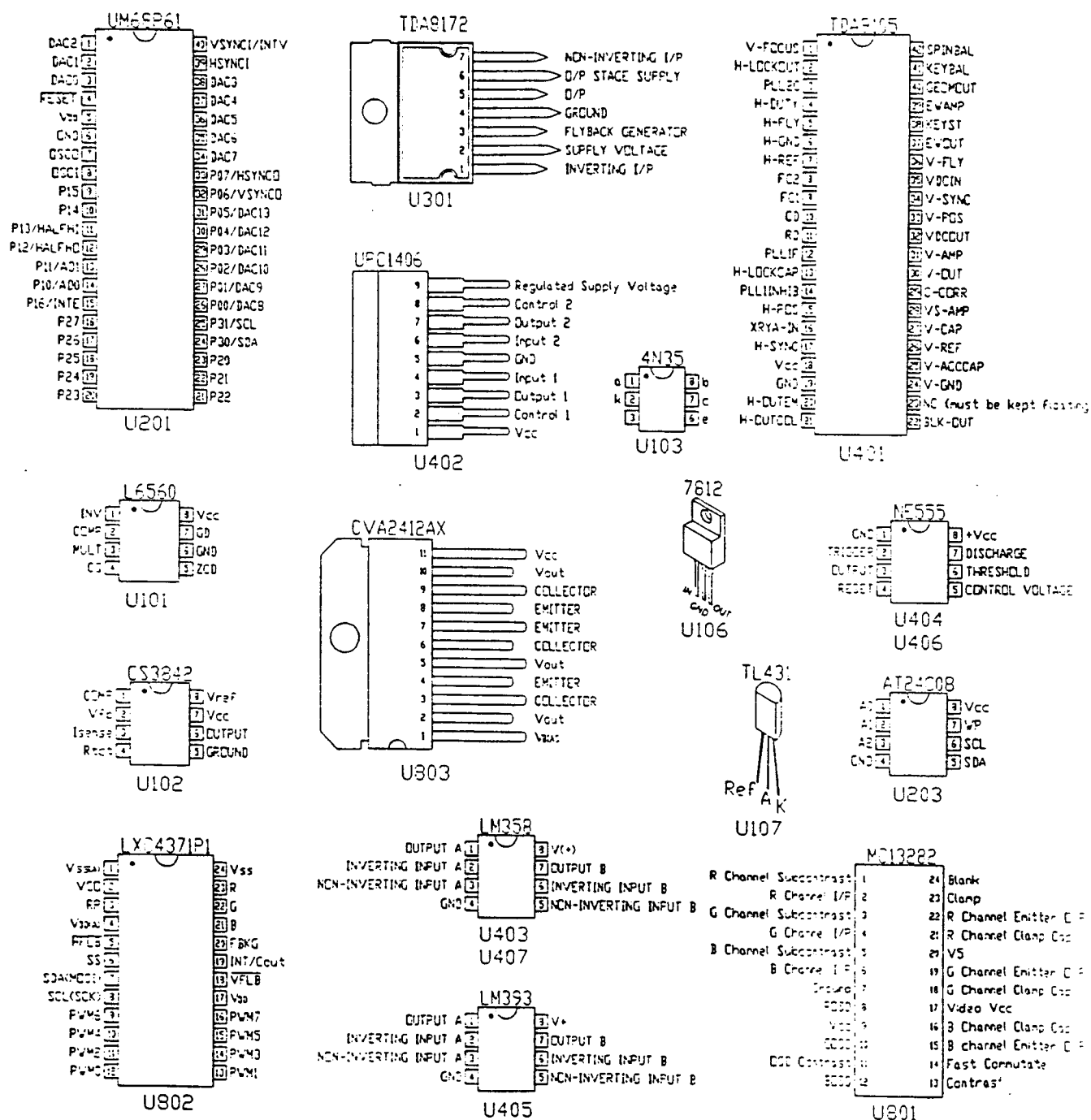




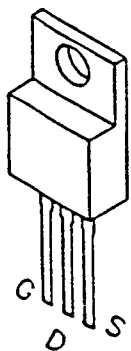
—



# IC/TRANSISTOR BLOCK DIAGRAMS

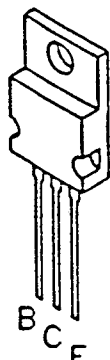


FS10KM-10



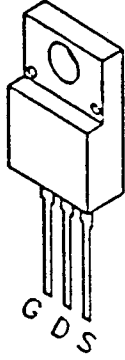
Q101

BU2532AL



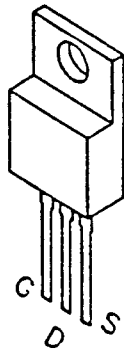
Q404

FS10SM-16

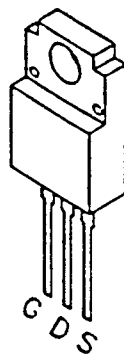


Q102

IRF640

Q406  
Q408  
Q410

K2485



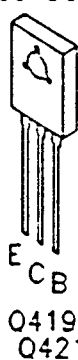
Q425

A1480

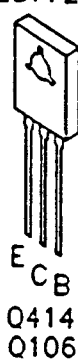


Q422

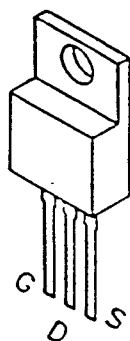
C3790

Q419  
Q421

2B772

Q414  
Q106  
Q109

FS10KM-5

Q412  
Q418  
Q431

A830

Q815  
Q814  
Q813

K941



Q403

A916



Q432

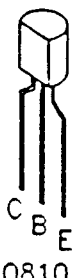
2N3904

Q427  
Q426

BF423

Q803  
Q804  
Q805  
Q435

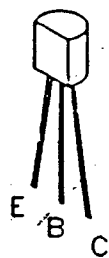
PH2369

Q810  
Q811  
Q812

C2705

Q807  
Q808  
Q809

C1384



Q103

MCR100-6



Q107

HTL145

Q423  
Q415

B772



Q106

A733

Q402  
Q204  
Q105  
Q437  
Q439  
Q436  
Q806

MPSA13

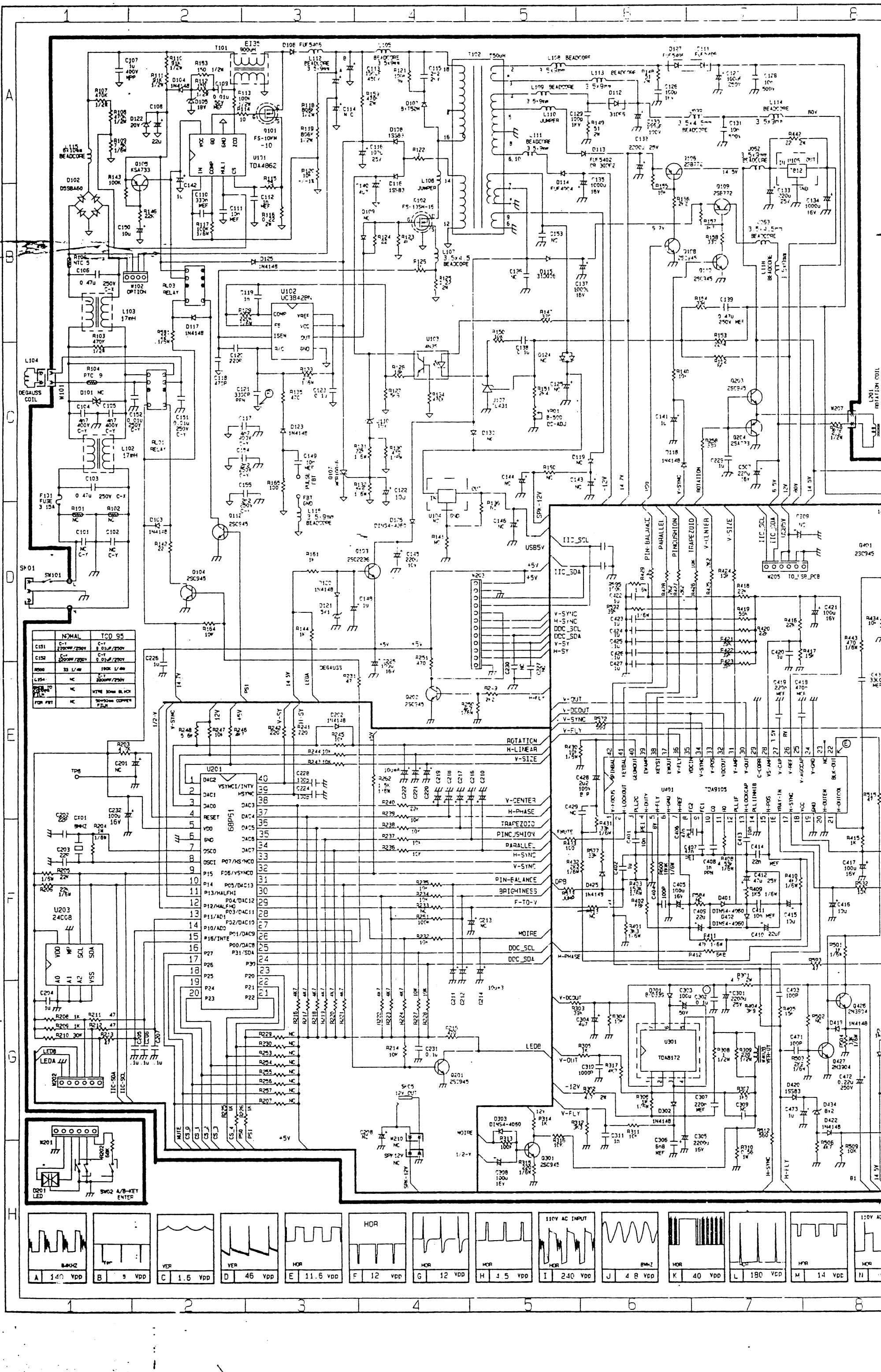
Q405  
Q415  
Q405

C3402

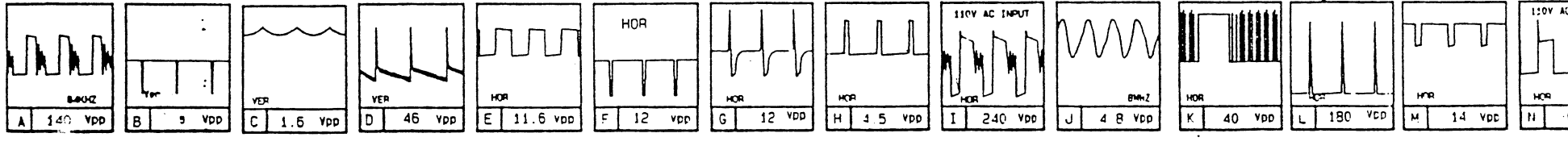
Q407  
Q421

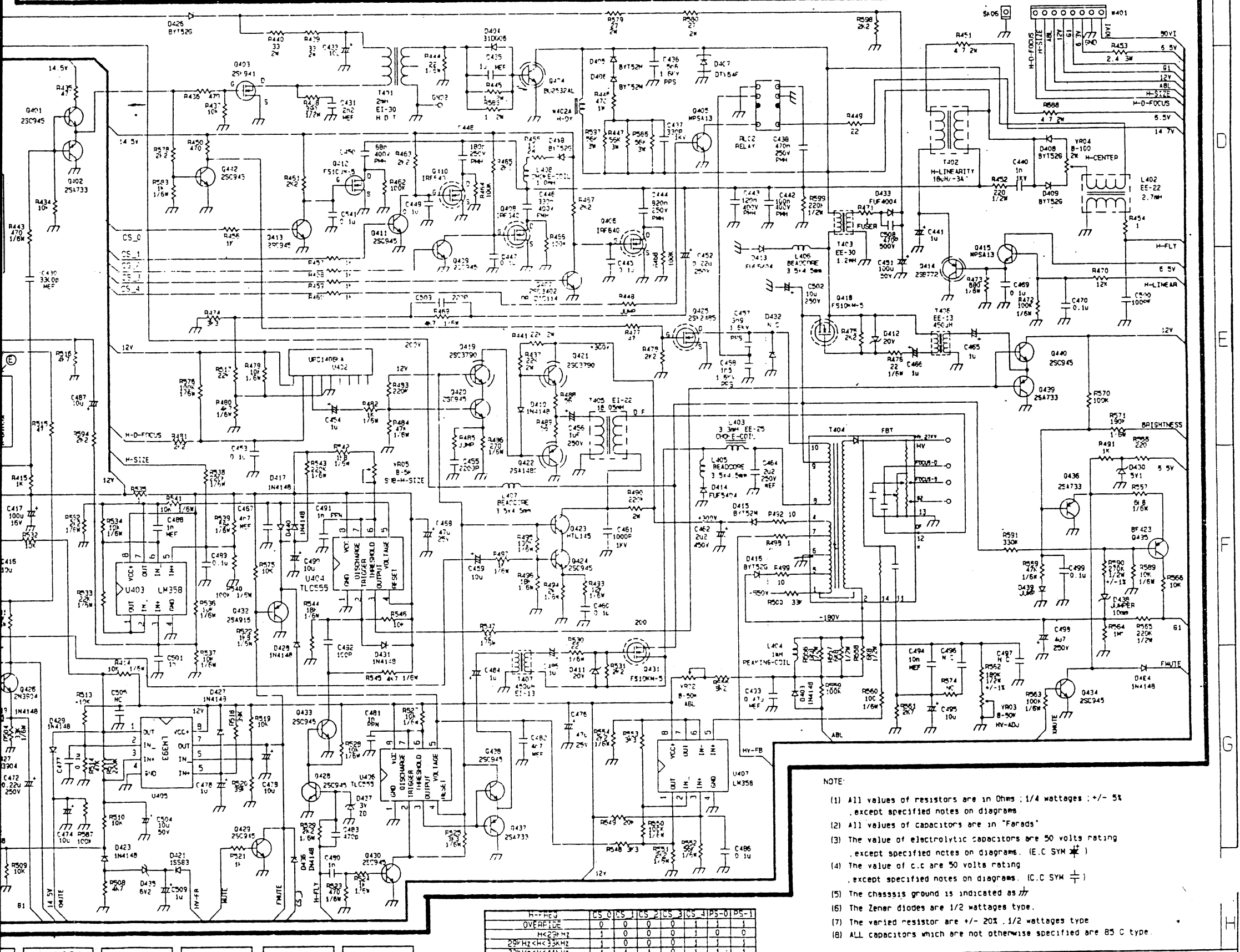
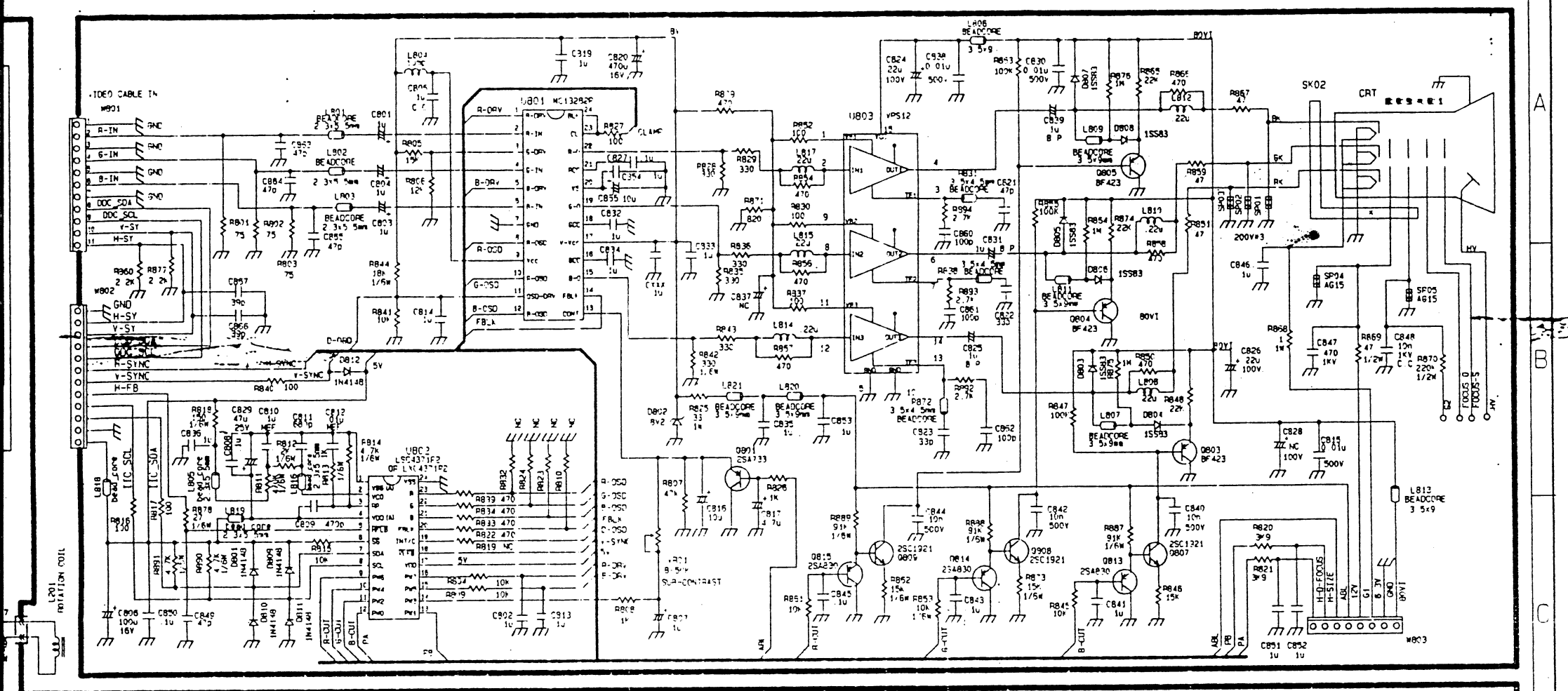
C945

Q112  
Q104  
Q201  
Q401  
Q301  
Q110  
Q440  
Q429  
Q424  
Q108  
Q202  
Q434  
Q442  
Q413  
Q411  
Q409  
Q420  
Q430



	NOMAL	TCD 95
C151	C-1 1000V/250V	C-1 1000V/250V
C152	C-1 2000V/250V	C-1 2000V/250V
R100	33 1/4W	10K 1/4W
L154	K	C-1 2000V/250V
U154	K	V-TIME 300M BLK
FOR PWT	K	3000M COMPT





ITEM	MAIN/CRT	DATE	PREPARE	CHECKED	APPROVED
MODEL	X-19MSX-19V	JUN/23/1998	SU.CHING.PAN		
FILE NAME	X19MV-18	SCH REV: 1.8			
ECN NO:					

# IMPORTANT SERVICE SAFETY INFORMATION

Operation of monitor outside of cabinet or with back removed involves a shock hazard. Work on these models should only be performed by those who are thoroughly familiar with precautions necessary when working on high voltage equipment.

Exercise care when servicing this chassis with power applied. Many B-plus and high voltage RF terminals are exposed which, if carelessly contacted, can cause serious shock or result in damage to the chassis. Maintain interconnecting ground lead connections between chassis and scutechon picture tube tag when operating chassis.

This monitor has a "polarized" AC line cord. The AC plug is designed to fit into standard AC outlets in one direction only. The wide blade connects the "ground side" and the narrow blade connects to the "hot side" of the AC line. This assures that the monitor is properly grounded to the house wiring. If an extension cord must be used, make sure it is of the "polarized" type.

Since the chassis of this monitor is connected to one side of the AC supply during operation, service should not be attempted by anyone not familiar with the precautions necessary when working on this type of equipment.

When it is necessary to make measurements or tests with AC power applied to the monitor chassis, an Isolation Transformer must be used as a safety precaution and to prevent possible damaged transistors. The Isolation Transformer should be connected between the signal cord plug and the AC power outlet.

Certain HV failures can increase X-ray radiation. Monitors should not be operated with HV levels exceeding the specified rating for their chassis type. The maximum operating HV specified for the chassis used in these monitors is  $24\text{kv} \pm 1.0\text{kv}$  at zero beam current with a line voltage of 110V(220V) AC. Higher voltage may also increase possibility of failure in HV supply.

It is important to maintain specified values of all components in the horizontal and high voltage circuits and anywhere else in the monitor that could cause a rise in high voltage, or operating supply voltages. No changes should be made to the original design of the monitor.

Components shown in the shaded areas on the schematic diagram and/or identified by  $\perp$  in the replacement parts list should be replaced only with exact Factory recommended replacement parts. The use of unauthorized substitute parts may create a shock, fire, X-radiation, or other hazard.

To determine the presence of high voltage, use an accurate, high impedance, HV meter connected between second anode lead and the CRT tag grounding device. When servicing the High Voltage System remove static charge from it by connecting 10K ohm resistor in series with an insulated wire (such as a test probe) between picture tube tag and 2nd anode lead (AC line cord disconnected from AC supply).

The picture tube used in this monitor employs integral impulsion protection. Replace with tube of the same type number for continued safety. Do not lift picture tube by the neck. Handle the picture tube only when wearing shatterproof goggles and after discharging the high voltage completely. Keep others without shatterproof goggles away.

Before returning the monitor to the user, perform the following safety checks:

1. Inspect all lead dress to make certain they are not pinched or lodged between the chassis and other metal parts in the monitor.
2. Replace all protective devices such as non-metallic control knobs,

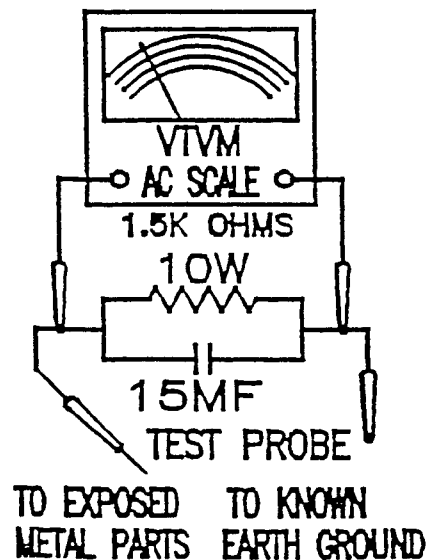
insulating fish-papers, cabinet backs, adjustment and compartment covers or shields, isolation resistor capacitor networks, mechanical insulators, etc.

3. To be sure that no shock hazard exists, a check for the presence of leakage current should be made at each exposed metal part having a return path to the chassis (cabinet metal, screw heads, knobs and/or shafts, escutcheon, etc.) in the following manner.

Plug the AC line cord directly into a 110V(220V) AC receptacle. (Do not use an Isolation Transformer during these checks.) All checks must be repeated with the AC line cord plug connection reversed. (If necessary, a non-polarized adapter plug must be used only for the purpose of completing these checks.)

If available, measure current using an accurate leakage current tester. Any reading of 0.35 MA or more is excessive and indicates a potential shock hazard which must be corrected before returning the monitor to the owner.

If a reliable leakage current tester is not available, this alternate method of measurement should be used. Using two clip leads, connect a 1500 ohm, 10 watt resistor paralleled by a  $0.15 \mu\text{F}$  capacitor in series with a known earth ground, such as a water pipe or conduit and the metal part to be checked. Use a VTVM or VOM with 1000 ohms per volt, or higher, sensitivity to measure this AC voltage drop across the resistor. Any reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the monitor to the owner.

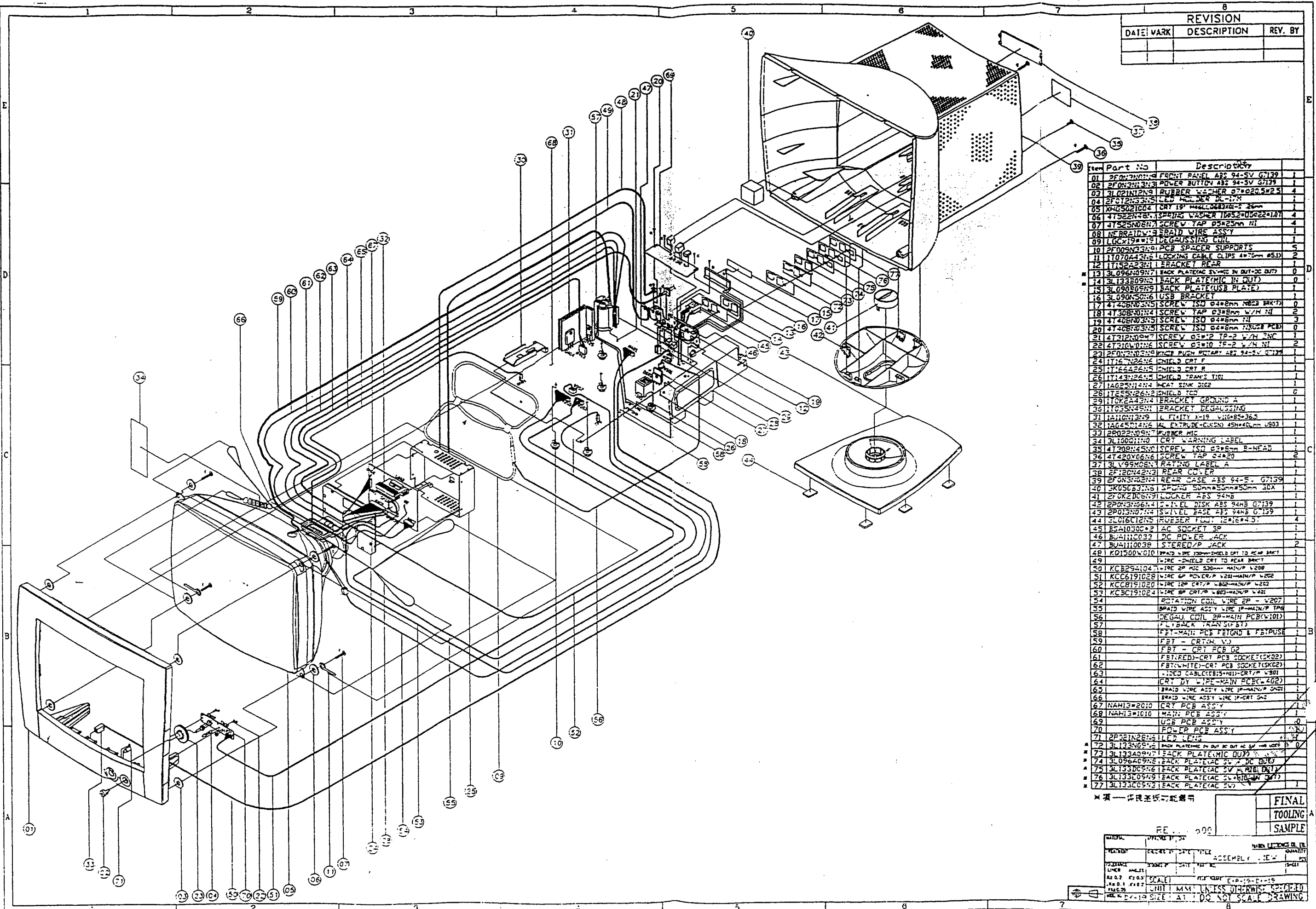


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EXPLODED VIEW/PARTS LIST



REVISION		
DATE	MARK	DESCRIPTION

Item	Part No	Description	QTY
01	2F0H2H01	FRONT PANEL ABS 94-SV G7139	1
02	2F0H2H02	POWER BUTTON ABS 94-SV G7139	1
03	2L021H2H	RUBBER WASHER 57*020.5*2.5	4
04	2F0H2H03	SLID FOLDER 1L-17H	1
05	2F0H2H04	CRY 19" MAGNETRON-2 26mm	1
06	4T525H08	SCREW WASHER 10052*0622*1.07	4
07	4T525H08	SCREW TAP 05*25mm NI	4
08	NEBRAID	BRAID WIRE ASSY	1
09	LCC19	DEGAUSSING COIL	1
10	2F0H2H05	PCB SPACER SUPPORTS	5
11	1107044	LOCKING CABLE CLIPS 40*6mm 0511	2
12	11152A23H1	BRACKET REAR	1
13	3L096H09H7	BACK PLATE(AC SWAGE IN OUT-DC OUT)	0
14	3L133H09H3	BACK PLATE(AC IN OUT)	0
15	3L090H09H9	BACK PLATE(USB PLATE)	1
16	3L090H09H6	USB BRACKET	1
17	4T408H03H5	SCREW ISO 04*8mm N023 BRKT	0
18	4T408H03H4	SCREW TAP 03*8mm W/H NI	2
19	4T408H03H5	SCREW ISO 04*8mm NI	3
20	4T408H03H5	SCREW ISO 04*8mm N023 PCB	0
21	4T312H09H7	SCREW 02*12 TP-2 W/H INC	1
22	4T312H09H6	SCREW 02*10 TP-2 W/H NI	2
23	2F0H2H06	PCB PUSH ROTARY ABS 94-SV G7139	1
24	11152A23H1	SHIELD CRT F	1
25	11152A23H1	SHIELD CRT R	1
26	11152A23H1	SHIELD TRANS T01	1
27	1A025H1H24	HEAT SINK DICE	1
28	11152A23H1	SHIELD T02	0
29	110K2A43H4	BRACKET GROUND A	1
30	110K2A43H4	BRACKET DEGAUSSING	1
31	1A110H1H29	L FLUITY 1-19 V100*85*36.5	1
32	1A045H1H24	AL EXTRUDE-GUSSET 45H*40mm 0503	1
33	2P022H09H1	INVERSE MIC	1
34	3L100H1H20	CRY WARNING LABEL	1
35	4T208H04H0	SCREW ISO 02*8mm R-HFAD	1
36	4T420H06H6	SCREW TAP 04*20	2
37	3L1V95H08H1	RATING LABEL A	1
38	2F120H42H3	REAR COVER	1
39	2F0H2H07	REAR CASE ABS 94-S- G7139	1
40	2K050H03H0	IMPING 50mm*50mm*50mm 30X	1
41	2F0K2H06H9	LOCKER ABS 94H	1
42	2P0H2H06H4	CD-R/DISK ABS 94H G7139	1
43	2P0H2H07H4	CD-R/DISK ABS 94H G7139	1
44	3L0H0H12H5	MUDDER FLUJ 12*16*4.5	4
45	2F0H2H08H2	AC SOCKET 3P	1
46	BUA11H0032	DC POWER JACK	1
47	BUA11H0038	STEREO/P JACK	2
48	KD150H010	WIRE 150mm SHIELD CRT TO REAR BRKT	1
49	KCB25H104	WIRE 2P 530mm MAIN/P V200	1
50	KCC6191028	WIRE 6P POWER/P V200-MAIN/P V200	1
51	KCC6191020	WIRE 10P CRT/P V200-MAIN/P V200	1
52	KCC6191024	WIRE 8P CRT/P V200-MAIN/P V200	1
53	KCB25H104	WIRE 2P 530mm MAIN/P V200	1
54		ROTATION COIL WIRE 2P - V207	1
55		BRAID WIRE ASSY WIRE 1P-MAIN/P T06	1
56		DEGAU. COIL 2P-MAIN/P PCB(W101)	1
57		FLYBACK TRANS(571)	1
58		FET-MAIN: PCB FET(04) & FET(PUSE)	1
59		FET - CRT(H: V.)	1
60		FET - CRT PCB G2	1
61		FET(RED)-CRT PCB SOCKET(SK02)	1
62		FET(WHITE)-CRT PCB SOCKET(SK02)	1
63		VIDEO CABLE(8.5+11)-CRT/P V301	1
64		CRY DY WIRE-MAIN PCB(W402)	1
65		BRAID WIRE ASSY WIRE 1P-MAIN/P GND	1
66		BRAID WIRE ASSY WIRE 1P-CRT GND	1
67	NAM13=2010	CRY PCB ASSY	1
68	NAM13=1010	MAIN PCB ASSY	1
69		USB PCB ASSY	0
70		POWER PCB ASSY	0
71	2F0H2H08H2	LED LENS	1
72	3L133H09H7	BACK PLATE(AC SWAGE IN OUT-DC OUT)	0
73	3L133H09H7	BACK PLATE(AC SWAGE IN OUT-DC OUT)	0
74	3L096H09H7	BACK PLATE(AC SWAGE IN OUT-DC OUT)	0
75	3L133H09H6	BACK PLATE(AC SWAGE IN OUT-DC OUT)	0
76	3L133H09H5	BACK PLATE(AC SWAGE IN OUT-DC OUT)	0
77	3L133H09H3	BACK PLATE(AC SWAGE IN OUT-DC OUT)	0

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DATE	DATE	DATE	DATE
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SCALE: 1:1

SIZE: A1

DO NOT SCALE DRAWING